THE RELATIONSHIP BETWEEN FATIGUE FACTORS, JOB FACTORS AND ENVIRONMENTAL FACTORS TOWARDS COMMUTING ACCIDENTS AMONG NURSES IN HOSPITAL BANTING SELANGOR

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Abstract

Commuting accidents are accidents occurring while travelling to or return from workplace was constantly increased from time to time and becoming a worldwide safety and occupational health issue. In Malaysia, the increasing number of commuting accidents among healthcare workers is alarming. Nurses contributed significantly to these causalities (53%), followed by hospital attendants (17%), medical officer and assistant medical officer, respectively, 6 percent. Studies have demonstrated that few risk factors are associated with commuting accident among nurses including fatigue factor as measured by work–rest scheduling and workload, job factor as measured by distance traversed and working shift and environmental factor as measured by geographical weather and traffic volume. The aims of the study is to examine the relationship between fatigue factor, job factor, environmental factor and commuting accident to or return from workplace among nurses also to determine the factor of the highest degree for contributing towards commuting accident to or return from workplace among nurses. A quantitative study, investigating 113 registered nurses in Hospital Banting Selangor. This is a cross sectional descriptive study with data collected from the registered nurses through completion of The Survey of Commuting Accident to or Return from Workplace. Data analysis showed there is positive low relationship between fatigue factor and commuting accident to or return from workplace among nurses (r = 0.445), there is a positive moderate relationship between job factor and commuting accident to or return from workplace among nurses (r= 0.560) and there is a positive moderate relationship between the environmental factor and commuting accident to or return from workplace among nurses (r=0.650). The most significant factor on commuting accident was environmental factor with the highest degree of significant value (p-value = 0.000). As such, it is timely that proactive actions be taken by employers to educate their employees, their most valuable assets, on safe commuting management involving safety awareness and effective implementation.

Keywords: commuting accident, registered nurses, fatigue, job and environmental.

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CHAPTER 1

INTRODUCTION

1.1 Introduction to the Study

Road traffic accidents are a worldwide safety and occupational health issue. The World Health Organization (WHO) stated that in 2017, approximately 3,400 people died on the road daily, which adds up to about 1.24 fatalities annually. Global Road Safety (2013) predicted that road traffic accidents would be the fifth leading cause of deaths worldwide by 2030. In parallel with the increase in road traffic accidents, the number of commuting accidents have also increased every year and become a major problem affecting organizations as well as governments (Rusli, 2014). The International Labor Organization (2015) stated that out of the 2.2 million work-related deaths occurring yearly, 158,000 could be attributed commuting accidents.

In Malaysia, there are approximately 22.3 million working citizens commuting to and/or from work daily (Department of Statistics Malaysia, 2017). Workers aged between 18 and 45 years are the population of road users with the highest incidences of commuting accidents (Global Road Safety Report, 2013). Although the mode of transportation varied, it was found that the majority commuted by private vehicle (Road Transport Department of Malaysia, 2017). The average person spent an estimated 50 minutes commuting to and/or from the workplace, and for individuals working in urban areas, the average time spent on the road could

increase dramatically based on traffic conditions (Road Transport Department of Malaysia, 2017).

According to the Social Security Organization (2012), there were three work-related deaths every day, with two out of the three deaths due to commuting accidents indicating a serious situation in the country. The report also stated that 20,810 of its respondents had been involved in accidents whilst commuting to and/or from the workplace. The impact of commuting accidents is far greater than that of industrial accidents as the former normally involves multiple injuries and these injuries are usually far worse and more traumatizing when compared to workplace accidents.

1.2 Background of the Study

Commuting accidents are categorized as accidents happening on the route between the worker's residence to the work site as well as on the route from the work site to the worker's residence (Herdiansah, 2013). The International Labor Organization (ILO) defines commuting accidents as an accident occurring on the habitual route, in either direction, between the place of work or work-related training and: (i) the worker's principal or secondary residence; (ii) the place where the worker usually takes his or her meals; or (iii) the place where he or she usually receives his or her remuneration; which results in death or personal injury.

The Social Security Organization (SOCSO) in Malaysia stated that while industrial accidents are on the decline in the country, commuting accidents have increased almost 49 percent in the six years from 2006 to 2012, from 17,704 cases to 26,269 cases. The commuting accidents are encompassing of the workforce which has been on the increase every year since 2006 (Nordin, 2014).

The Chairman of the National Institute of Occupational Safety and Health (NIOSH), Tan Sri Lee Lam Thye, described the increase in commuting accidents of 65.3 percent from 2006 to 2016 as "very alarming". He also said factors such as globalization, demographic change, migration, growing family structures and the impact of worldwide economic and financial crisis had also adversely affected workers' safety and health.

The ILO stated that while safety risks resulting in work accidents are diminishing, accidents resulting from work-related commuting are on the rise. Out of the 2.2 million work-related deaths occurring every year, 350,000 deaths were from accidents at work, 1.7 million due to occupational diseases, and 158,000 due to commuting accidents. While the number of commuting accident deaths appears to be lower than fatalities resulting from accidents at work and occupational diseases, this number has been increasing annually. Thus, it is crucial to make safety awareness and prevention a main priority in preventing further increases in deaths from commuting accidents.

A study conducted by SOCSO and the University Technology Mara (UiTM) showed that 88 percent of road accidents occurred while commuting to or from the workplace. The study also found that 68.8 percent of cases involved employees who

worked in the morning, with 55 percent of accidents occurring within a radius of less than 5 kilometers from the workplace.

The General Director of Malaysia's Ministry of Health, Datuk Dr. Noor Hisham Abdullah, said of the total 4431 victims of commuting accidents, 554 were healthcare workers, and involved in accidents outside of normal office hours between 5 pm and 8 am that were caused by factors such as overtime work, post night shift, and post on-call shift (The Star, 2017).

The Deputy Minister of Human Resource, Datuk Seri Ismail Abdul Mutalib, said the increase in the number of commuting accidents was a cause for concern as the incidents mostly occurred within five kilometers from the workplace. The number of road fatalities due to a commuting accidents in Malaysia was “terrifying” because there were more than 6,000 fatalities every year, or approximately 18 to 20 people killed every day, with most of the victims being young and in the prime of their lives (Likita et al., 2016).

The Road Safety Department of Malaysia (2017) reported that the number of registered private vehicles has substantially increased between 2007 and 2017, from 9,433,640 to 27,613,264. The increasing number of private vehicles year-on-year in Malaysia was due to these vehicles being an important mode of daily transport, as also observed in other Asian developing countries. The increasing number of accidents involving Malaysians commuting to work has seen SOCSO paying out a staggering Ringgit Malaysia (RM) 720 million in compensation in 2013 (Selamat & Surienty, 2017).

1.3 Problem Statement

According to SOCSO (2017) the trend for commuting accidents is perceived to be constantly increasing over time. The number of commuting accidents and the compensations paid has increased gradually each year (Nordin, 2014). There were 66,618 workplace accidents in 2016, with 35,304 of the cases classified as industrial accidents, and the remaining 31,314 cases as commuting accidents. This was an increase of 8.9 percent compared to 2015 when there were only 28,591 cases of commuting accidents.

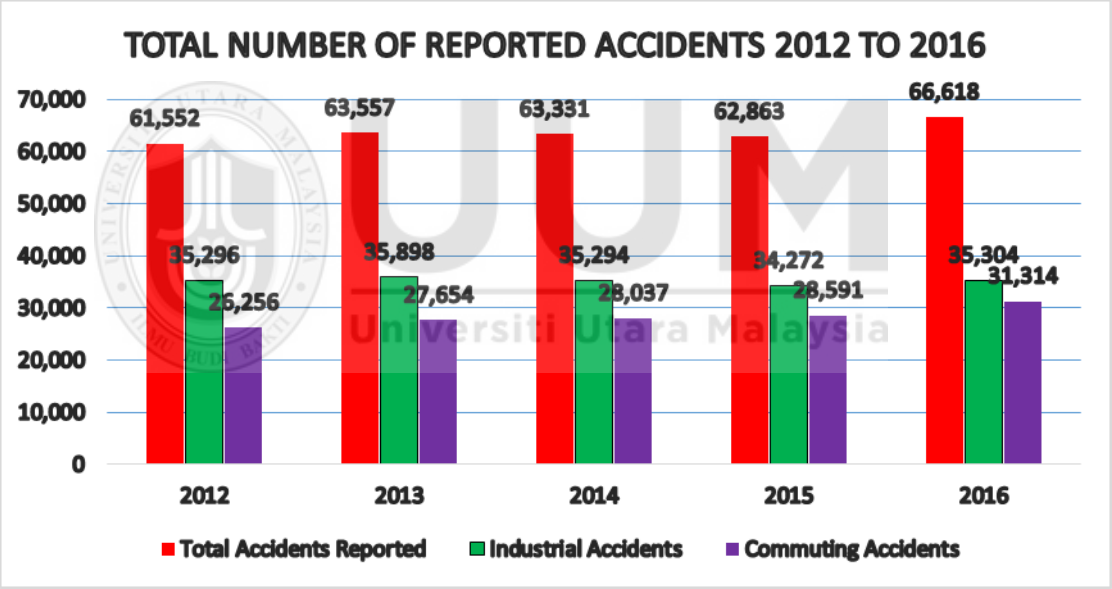

Figure 1.1: Total Number of Accidents Reported 2012 to 2016 (Retrieved from SOCSO Report, 2017)

Figure 1.1 shows the number of industrial accidents and the number of commuting accidents reported from 2012 to 2016. It can be observed that the number of industrial accidents reported has slightly decreased from 35,296 cases in 2012 to 34,272 cases in 2015, followed by an increment to 35,304 cases in 2016.

In contrast, the trend for commuting accidents has continuously increased each year from 26,256 cases in 2012 to 31,314 cases in 2016. SOCSO reported that the number of deaths due to the commuting accidents was 760, which was nearly two times more than the 471 deaths caused by accidents that happened at the workplace (Abdelfattah, 2016).

The Ministry of Health (MoH) (2016) stated that the trend for commuting accidents involving healthcare workers has also shown a gradual increase over the past five years. SOCSO (2016) reported that public service sector workers, which included healthcare workers, had the second highest incidences of commuting accidents recorded in 2015 (Sukor, 2017).

The Director-General Malaysia's Ministry of Health Malaysia (MoH), Datuk Dr. Noor Hisham Abdullah, expressed his concerns towards the country's unsafe driving culture and highlighted the need for immediate and prompt senior management commitment towards the safety and health of their employees (Hisham, 2015).

According to Yaacob (2018), issues related to the rising number of commuting accidents included a lack of awareness among the workers on safe riding and driving strategies while commuting to work, a lack of comprehensive training programs targeted to reduce commuting accidents, a lack of commuting safety management, and a lack of road safety elements in workplace OSH Management Systems.

According to the Malaysian Institute of Road Safety Research (MIROS), Selangor was the state with the highest number of total road accidents recorded with a total 151,253 cases involving 1,140 cases of fatalities and 19,073 cases of causalities (MIROS, 2017). Thus, the chances of workers in Selangor being involved in a commuting accident were higher especially for workers who commuted daily to or from the workplace.

Hospital Banting is the only general hospital serving the Kuala Langat and Sepang districts. It is considered as a hectic workplace because the number of workers at the hospital is lower than other similar hospitals nearby such as the Hospital Tengku Ampuan Rahimah Klang (HTAR) and Hospital Shah Alam (HSAS). Therefore, Hospital Banting is an ideal environment to study the various factors leading to commuting accidents.

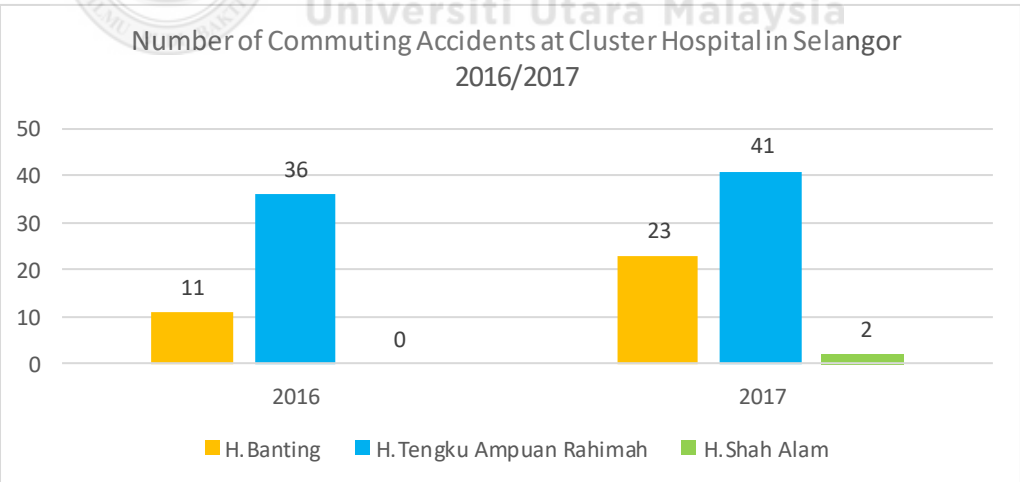

Figure 1.2: Number of Commuting Accidents at Cluster Hospital in Selangor 2016/2017 (Retrieved from Data Unit Kesihatan Awam (UKA) JKNS, 2017)

Figure 1.2 shows the number of commuting accidents occurring at three neighboring cluster hospitals in Selangor. According to the data from Unit Kesihatan Awam (UKA) Jabatan Kesihatan Negeri Selangor (2017), Hospital Banting had the highest percentage based on ratio of workers to commuting accident occurrences (3.8%) compared to Hospital Tengku Ampuan Rahimah (2.7%), although the number of cases of commuting accident cases reported at Hospital Tengku Ampuan Rahimah (41 cases) was higher than at Hospital Banting (23 cases).

Therefore, identifying the related risk factors affecting commuting accidents among nurses in Hospital Banting is important, in order to take appropriate actions to prevent and mitigate the health and economic impact of commuting accidents as well to formulate effective strategies to reduce such accidents.

Once risk factors have been identified, hospital administrators can initiate programs to mitigate these risks before they impact the nurses, and in turn, the overall efficiency of the hospital negatively. These programs can then be monitored, evaluated and further enhanced to ensure their effectiveness in reducing commuting accidents.

1.4 Research Questions

1. What is the relationship between fatigue factors and commuting accidents to or return from workplace among nurses?
2. What is the relationship between job factors and commuting accidents to or return from workplace among nurses?
3. What is the relationship between environmental factors and commuting accidents to or return from workplace among nurses?

1.5 Research Objectives

1. To identify the relationship between fatigue factors and commuting accident to or return from workplace among nurses.
2. To identify the relationship between job factors and commuting accident to or return from workplace among nurses.
3. To identify the relationship between environmental factors and commuting accident to or return from workplace among nurses.

1.6 The significance of the Study

The present study will extend the existing knowledge about the occurrence of commuting accidents among nurses in Malaysia which could be attributed to many factors.

As past studies have predominantly studied commuting accidents among healthcare workers from the employer's perspective, researching the issue from the worker's perspective will allow for further understanding of safety concepts and factors, and the impact of commuting accidents on healthcare workers especially nurses.

Data from this study could be used by organizations in the implementation of appropriate accident prevention and safety awareness measures that could lower the incidence of commuting accidents not only among nurses, but successful prevention programs may also be implemented to help reduce similar accidents for all health care workers in Malaysia.

1.7 Definition of Key Terms

1. *Commuting accident:*

   An accident occurring on the habitual route, in either direction, between the place of work or work-related training and: (i) the worker's principal or secondary residence; (ii) the place where the worker usually takes his or her meals; or (iii) the place where he or she usually receives his or her remuneration; which results in death or personal injury. (International Labor Organization, 2014).

2. *Fatigue factor:*

   The adverse reaction and increasing process linked with reluctance towards the effort, ultimately resulting in reduced performance effectiveness (Violanti, 2012).

3. *Job factor:*

   An estimate of the effort or time needed by a potential adversary, with specified expertise and resources, to overcome a protective measure (Oxley, 2013).

4. *Environmental factor:*

   Relating to or caused by the surroundings in which someone lives or something exists; relating to the environment in which people, animals, and plants live (Cambridge English Dictionary, 2016).

1.8 Organization of The Dissertation

The dissertation is organized as follows:

Chapter Two describes the background information in terms of relationships between independent and dependent variables. Specifically, Chapter Two covers the review from previous literature concerning fatigue factors, job factors and environmental factors towards commuting accidents among nurses.

Chapter Three describes the methodologies used for this study including the present study research framework, study design, sampling method, and detailed descriptions of research instruments and data analyses techniques.

Chapter Four presents the results and findings from the study presented. The relationship between fatigue factors, job factors, environmental factors and commuting accidents are defined and interpreted based on the data analyzed.

Finally, Chapter Five presents conclusions and future study recommendations.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter will review in further details the important issues and risk factors considered relevant to commuting accidents to or from the workplace, especially among nurses.

2.2 Definition and Conceptualization of a Commuting Accident

A commuting accident can be defined as an accident happening on the route between the worker's residence and the work site as well as the route from the work site to his residence (Selamat et al., 2017). Kirch (2008) described commuting accidents as accidents occurring on the regular journey, or the usual route, from and to workers' eating places and other work-related places which result in injury or death. James (1983) defined the term "commuting" as the journey from home to the workplace or from the workplace back to home whereas an "accident" referred to the occurrence of an unplanned event resulting in injury to persons, or damage to plant and equipment, or both.

According to Malaysian law, the definition of a commuting accident can be found in Section 24 of the Employees' Social Security Act 1969, which states that commuting accidents are accidents arising out of and in the course of employment that occur while the employee is travelling on the route directly between the place of work and the worker's place of residence or the place where for any reason which is

directly connected to his employment or to the place where the worker usually takes his or her meals during any authorized recess.

Section 24 further excludes any accident which occurs during any interruption of, or deviation from, the worker's journey made for the above purposes. It is clear from the definition that an employee's travel from his home to the workplace and from the workplace to his home would constitute a journey directly connected with his employment.

Aziz and Yusof (2015) stated that the law does not only deal with workplace accidents or injuries but also includes commuting accidents. Commuting accidents are not new in occupational safety and health regulations, but any accident that occurs during commuting must fall within the ambit of the law in order to be treated as a commuting accident. The time, place and circumstances of the accident are significant to determine such an occurrence.

2.3 Commuting Accidents in Malaysia

According to the Social Security Organization (SOCSO) Annual Report (2017), there were 66,618 accidents in total in 2016, of which 35,304 were industrial accidents and the remaining 31,314 cases were classified as commuting accidents. This means that 53% were industrial accidents and 47% were work-related commuting accidents. The 2016 SOCSO data showed an increase of 3,781 cases overall or 5.68% in comparison to 2015, when 62,837 accidents in total was recorded.

Table 2.1 gives a breakdown of the accidents reported from 2012 to 2016. It can be seen that from 2015 to 2016, the number of industrial accidents reported showed an increment of 2.96%, from 34,258 cases to 35,304 cases, while the number of commuting accidents reported over the same period had a larger increment of 8.73% or 2,735 cases, from 28,579 cases to 31,314 cases.

Table 2.1
Total Number of Accidents Reported:

Item	2012	2013	2014	2015	2016
Bilangan kemalangan dilaporkan Number of accidents reported	61,552	63,557	63,331	62,837	66,618
Bilangan kemalangan semasa perjalanan[1] dilaporkan Number of commuting[1] accidents reported	26,256	27,659	28,037	28,579	31,314
Bilangan kemalangan perusahaan[2] dilaporkan Number of industrial[2] accidents reported	35,296	35,898	35,294	34,258	35,304
Kadar kemalangan (per 10,000 pekerja) Accident rate (per 10,000 employees)	105	104	102	99	101
Kadar kemalangan perjalanan (per 10,000 pekerja) Commuting accident rate (per 10,000 employees)	45	45	45	45	47
Kadar kemalangan perusahaan (per 10,000 pekerja) Industrial accident rate (per 10,000 employees)	60	59	57	54	54

SOCSO, established as a government department to enforce the Employees' Social Security Act 1969, administers the Employment Injury Insurance Scheme - protection for employees against industrial accidents including occupational diseases and commuting accidents. As a consequence of the increasing accidents reported, SOCSO has dispensed a huge amount of compensation and the amount has been increasing each year (SOCSO, 2016). The annual compensation amount has increased from RM2 billion in 2012 to RM2.6 billion in 2015, with a quarter of the total amount spent for commuting accidents procurement payment (Bakar, 2017).

A report by the Ministry of Health (MoH) (2016) showed the trend for commuting accidents involving healthcare workers has increased gradually over the past five years. The report stated that commuting accidents among healthcare workers happened mainly during travel to and from work (88.5%), during the morning shifts (68.8%), and involved less than five kilometers of travel (55.0%). The Director-General of MoH, Datuk Dr. Noor Hisham Abdullah, expressed concerns over Malaysia's unsafe driving culture, especially during the period after finishing work, and highlighted the need for immediate and prompt senior management commitment towards the safety and health of their employees.

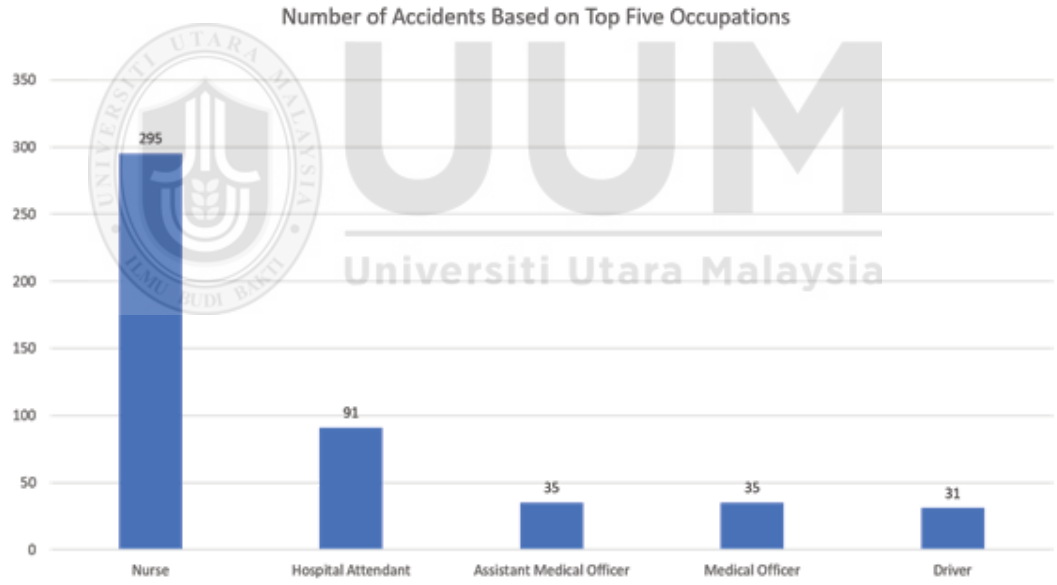

Figure 2.1: Number of Commuting Accidents by Healthcare Occupations in 2015 (Retrieved from MOH Report, 2016)

Figure 2.1 shows the number of commuting accidents recorded by healthcare occupations reported in 2015. The MoH (2016) reported nurses contributed significantly to these statistics (53%), followed by hospital attendants (17%),

medical officers (6%), and assistant medical officers (6%) (Yaacob, Ismail, Zuwairy, & Shaarial, 2018).

The Ministry of Transport (MoT) (2016) reported the latest statistics of road traffic accidents has increased by 6.21 percent in 2016 with 521,466 cases compared to 489,606 cases in 2015 with 7,152 cases of fatalities. Selangor was the state with the highest number of road accidents at 151,253 cases in total with 1,140 cases of fatalities, while Perlis was the state with the lowest incidences with only 2,062 cases of road traffic accidents reported (Data from Traffic Branch Bukit Aman, 2016).

Table 2.2
Total Road Accidents by State, Malaysia, 2007 to 2016
(Retrieved from MOT Report, 2016)

NEGERI *State*	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
PERLIS	1,364	1,417	1,633	1,548	1,791	1,881	1,895	1,888	1,861	2,062
KEDAH	16,172	16,520	17,701	17,966	19,699	19,935	20,228	20,159	22,016	23,200
PULAU PINANG	33,881	34,049	33,719	34,306	37,158	37,851	39,361	38,747	39,856	42,244
PERAK	29,203	30,539	32,327	32,072	33,506	34,714	35,408	35,131	36,736	38,531
SELANGOR	99,157	100,380	107,429	115,565	128,876	129,106	135,024	137,809	140,957	151,253
W.P. KUALA LUMPUR	49,454	48,671	51,942	53,493	58,795	61,872	64,527	63,535	64,664	68,866
NEGERI SEMBILAN	16,079	17,362	18,369	19,407	21,157	22,146	23,066	23,748	22,939	24,428
MELAKA	11,720	12,105	13,275	14,110	14,720	15,195	16,083	16,375	17,069	18,601
JOHOR	46,584	48,667	51,747	55,381	59,501	62,316	64,600	64,473	67,112	73,116
PAHANG	13,982	15,629	17,068	17,315	19,001	20,554	20,130	19,071	19,635	20,465
KELANTAN	8,116	8,842	9,549	9,707	9,603	9,968	9,748	10,326	9,960	10,544
TERENGGANU	8,155	8,814	10,118	10,106	10,684	10,861	10,996	9,383	10,381	10,793
SABAH	14,256	14,588	15,798	16,192	16,585	17,446	17,438	17,858	17,290	17,298
SARAWAK	15,196	15,488	16,655	17,253	17,964	18,578	18,700	17,693	19,130	20,065
JUMLAH *Total*	363,319	373,071	397,330	414,421	449,040	462,423	477,204	476,196	489,606	521,466

The Malaysian Institute of Road Safety (MIROS) (2016) found that many road fatalities involved those who were the main income earners for their families. Their death caused their family not only the loss of a loved one but also drove them into an unhealthy financial condition. The analysis found that the cost of lost output estimated from the loss of life on the road was considerably huge and noteworthy. The future value of lost output was expected to increase in tandem with income growth and the increase in the number of a fatalities on the road. The study recommended that both the government and private bodies should work together to ensure these economic losses could be reduced in order for the country to grow progressively.

According to the Ministry of Human Resources, one reason the number of vehicles involved in commuting accidents had been increasing was the dramatic increase in private vehicle ownership from 9,433,640 in 2007 to 27,613,264 in 2017 (Nordin, 2014).

2.4 Risk Factors affecting Commuting Accidents

WHO (2015) defined a risk factor as “any attribute, characteristic or exposure of an individual that increases the likelihood of developing a disease or injury”. In particular, commuting accidents are affected by many risk factors including fatigue factors such as symptoms of tiredness and sleepiness, job factors such as irregular working hours due to shift work, and excessive workload burden, and environmental factors such as weather, and road, vehicle and traffic conditions (SOCSO, 2014).

2.5 Fatigue Factors and Commuting Accidents

Fatigue can be defined as a steady and increasing process linked with reluctance towards the effort, ultimately resulting in reduced performance effectiveness (Batak et al., 2013). Fatigue can lead to a deterioration in driving performance, manifesting itself in slower reaction time, diminished steering performance, lesser ability to keep a safe distance from the car in front, and an increased tendency to mentally withdraw from the driving task (Batak et al., 2013).

The Malaysian Institute of Road Safety (MIROS) has stated that driver fatigue leading to drivers falling asleep while driving was a major cause of commuting accidents that led to serious accidents on motorways and other monotonous road environments. Oxyle (2013) found that driver fatigue caused up to 20% of accidents on monotonous roads. Rayner (1995) found that sleep-related accidents comprised 16% of all road accidents, and 23% of accidents on motorways.

SOCSO (2015) identified driver fatigue as one of the main areas of driver behavior that needed to be addressed if the 2020 target of reducing by 40% the number of people killed and seriously injured in road accidents was to be achieved. The general factors that caused fatigue were lack of sleep, poor quality sleep, and sleep demands induced by the internal body clock.

Prolonged driving could increase driver fatigue, especially when drivers did not take sufficient breaks (Sando, Mtoi & Moses, 2010). For specific groups of

drivers, for example professional drivers, these general factors often played a more persistent role due to long or irregular work schedules (Parkes, 2017).

Schutter and Maldonado (2003) claimed that driver fatigue was a problem particularly for truck drivers. Schutter et al. (2003) stated that 20 percent of all fatal crashes and 10 percent of all injuries involving a long-haul truck occurred between midnight and early morning (0600 hours), the peak period for driver fatigue.

Adam (2003) found that 67% of truck drivers with irregular schedules had been involved in fatigue-related accidents, compared to 38% of drivers with regular schedules. Also, 82% of drivers who admitted to having exceeded the number of permissible driving hours had had a fatigue-related accident. The most important measures in predicting a fatigue-related accident in the sample were the duration of the last sleep period, the total hours of sleep obtained during the 24 hours prior to the accident, and split sleep patterns.

Johnson (1998) found slightly lower proportions of sleep-related accidents - about 9% to 10% of accidents on all roads and 15% of accidents on motorways involved driver sleepiness. The study suggested that 2.6% of accidents were caused by driver inattention.

According to a study by Hell (2007), driver fatigue contributed to 370 heavy motor vehicles accidents. The study involved 114 fatal road crashes and 1,314 injuries were thought to be fatigue-related. Zomer (2002) found that 3.9% of 9,200 of road accidents were sleep-related due to driver drowsiness.

2.6 Job Factors and Commuting Accidents

According to Zhao, Bogossian and Turner (2010) a job factor can be defined as an activity involving mental or physical effort made in order to achieve a result. Job factors such as nature of job performance and working schedule are some factors contributing to the rising number of commuting accidents (Ramli, 2013). Workers involved in rotating shift work may find themselves to be more fatigued, less attentive, and more prone to commuting accidents or near miss incidents (Sando et al., 2010).

Driving capability and demands were the two important elements in preventing commuting accidents (Abang et al., 2011). If the demand exceeded capability, the inability to perform the task would lead to an accident. The inability or disinclination that disturbed driving capability were affected by many factors including fatigue factors which come from individual human factors itself involving physical and mental health status, job or work factors such as workplace distance to commute, work type and work schedule that may interfere with biological body behaviors, and also environmental factors like vehicle condition, road condition and weather condition (Abang et al., 2011).

Oxley, Yuen, Ravi and Hoareau (2013) investigated two groups: those working shifts and those who worked regular hours. The authors did not find that people who were working shifts had a higher possibility to be involved in commuting accidents. The study found that the morning shift contributed a higher

number of victims, 68.8%, compared with the evening and night shifts with 14.6% and 16.6 % respectively (SOCSO, 2010).

Shift workers are more likely to have less sleep and more sleep disturbances compared to non-shift workers. Disruptions to the circadian rhythm were associated with impaired attention and performance, and slower reaction times (Finn, 1973). Shift workers reported that they required seven days to recover and this condition was the greatest influence on their state of increased sleepiness, while in non-shift workers the level of fatigue was only disruptive on their social life (Lee, 1997).

According to Home and Reyner (2009) nurses working night shifts often suffered from a lack of sleep and fatigue leading to poor performance and an increased risk of errors and accidents. Shift work reduced both the quality and quantity of sleep and this lack of sleep led to less ambitious and less productive employees (Oexman et al., 2002).

Congruent with these findings, Batak, Gvozdenovic, Bokan and Scott (2013) also found that nurses on the night shift and rotating shifts were more likely to get less sleep and therefore made more mistakes than day shift nurses. Thus, rotating shift work was also associated with more frequent near misses and accidents.

Abang, Abdullah and Von (2011) stated that seven types of costs impact needed to be covered when commuting accidents occurred. They were direct medical costs, direct nonmedical costs, productivity loss, leisure time loss, costs related to

permanent invalidity, costs related to pain, and costs related to negative psychological consequences.

Batak et al., (2007) investigated the rate of road accidents related to sleep duration in 448 shift nurses and found that road accidents occurred more frequently on the way home from morning and night shifts. The nurses who reported accidents generally slept less than their colleagues.

Vitale (2015) studied 895 nurses who were asked to keep a detailed log book and found that working night shifts was associated with having a shorter duration of sleep, difficulties remaining awake at work, and increased drowsiness while driving, particularly when driving home after their shift.

2.7 Environmental Factors and Commuting Accidents

According to the Oxford Dictionary, environmental factors are defined as factors relating to the natural world and its impact on human activity. Commuting journeys involving long periods of driving on monotonous roads, such as motorways, were more likely to result in a driver falling asleep at the wheel, especially when it involved a larger vehicle or when driving high-mileage car (Violanti, 2012). Therefore, journeys which involved driving long hours and, to a lesser extent, in the middle of the afternoon, were likely to generate more risk.

Andrey (2003) stated that rain reduced road friction resulting in increased skidding, impaired visibility and made vehicle handling more difficult with the loss

of control. The author further stated that seven percent of all injury collisions were attributable to weather. In a report with similar findings, Paul (2008) stated twenty-four percent of all crashes yearly were weather-related with nearly 7,400 people are killed and over 673,000 people injured due to road crashes.

Maycock (2008) also found that those driving a high-mileage car on monotonous roads with tight schedules had a high probability of accidents. Poorly maintained vehicles were most likely to cause a road traffic accident especially if the wipers were faulty and the tires worn, to the extent that they were not functioning adequately, as the driver would be unable to see ahead and unable to control the vehicle (Agbonkhese et al., 2003).

Commuting accidents tend to be more severe when higher speeds are involved and the driver is unable to take any avoiding action, or even brake, prior to the collision. Wang (2003) stated excessive speeds during rainy days was the main reported cause of road traffic crashes in China. Driving errors such as loss of control of the vehicle, misjudgment and improper overtaking were likely to occur in bad weather conditions and that contributed to commuting crashes among road users (Odero, 2003).

2.8 Other Related Factors and Commuting Accident

Commuting constitutes a transition period between the work and home domains, ruminating while commuting may be especially detrimental. When one commutes, they must focus their cognitive resources, such as attention, on their

actions as well as the actions of those that surround them, in addition to the commuting environment, weather, and road conditions. Research suggests that those who engage in rumination may not be able to adequately switch their attention from what is going on internally example repetitive thoughts, to what is going on externally example practicing safe commuting behaviors (Oxley et al., 2013).

Commuting journeys involving long periods of driving on monotonous roads, such as motorways, are more likely to result in a driver falling asleep at the wheel (Violanti, 2012). Journeys that are for work purposes, especially ones involving larger vehicle or driving high mileages car, are also a high risk type of journey. As discussed above, there is a clear relationship between time of day and the likelihood of falling asleep while driving. Therefore, journeys which involve driving in the early hours, and to a lesser extent in the middle of the afternoon, are likely to generate more risk towards commuting accidents.

Roads which involve sustained, monotonous driving, with little visual stimulus for the driver, and where drivers are not required to attend to either the vehicle's controls or respond to multiple road users and junctions, are more likely to have sleep related accidents. Urban roads are less prone to fatigue crashes because the level of activity is so much greater and helps to keep drivers active and alert (Dorrian et al., 2008).

Based on the survey of over two thousand drivers sought to determine how truck drivers plan for and address their needs and how truck drivers select when, where, and at which facilities they park found that the truck drivers preferred rest areas with provided food, fuel, restrooms, phones and showers. Drivers tended to

favor private rest areas over public rest areas except when the drivers needed to nap for a short period of time (Chen, 2002).

Besides that, some of the commuting accidents were due to drivers' attitude (Home, 2008). Commuting accidents tend to be more severe, possibly because of the higher speeds involved and because the driver is unable to take any avoiding action, or even brake, prior to the collision. A study of schedules of 498 long-distance drivers found that, assuming average legal speed limits of 55 mph, 26% of the drivers had schedules that required them to exceed speed limits in order to meet the schedule (Sagberg, 1999). Thus, driving in rushing and high speed condition are likely to produce more risk towards commuting accidents.

2.9 Summary

The literature review presented in this chapter has provided background information for the topic of commuting accidents with the factors related involving fatigue, job and environmental conditions. Thus, ccommuting accident can be contributed by many dominant factors including fatigue factors such as symptoms of tiredness and sleepiness, job factors like irregular working hours, shift works and excessive workload also influence by environmental factors like weathers, road, vehicles and traffic conditions.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter will describe the research method used for this study. Research methodology is used to obtain the objectives of the study and giving comprehensive results of the study despite avoiding deviation on the objectives. There are three stages involved in the study, namely research design, data collection, and data analysis. In terms of data collection, a survey method was applied to gather data from the respondent sample. For the data analysis, the Statistical Package for Social Science (SPSS) Version 23.0 was used.

3.2 Research Framework

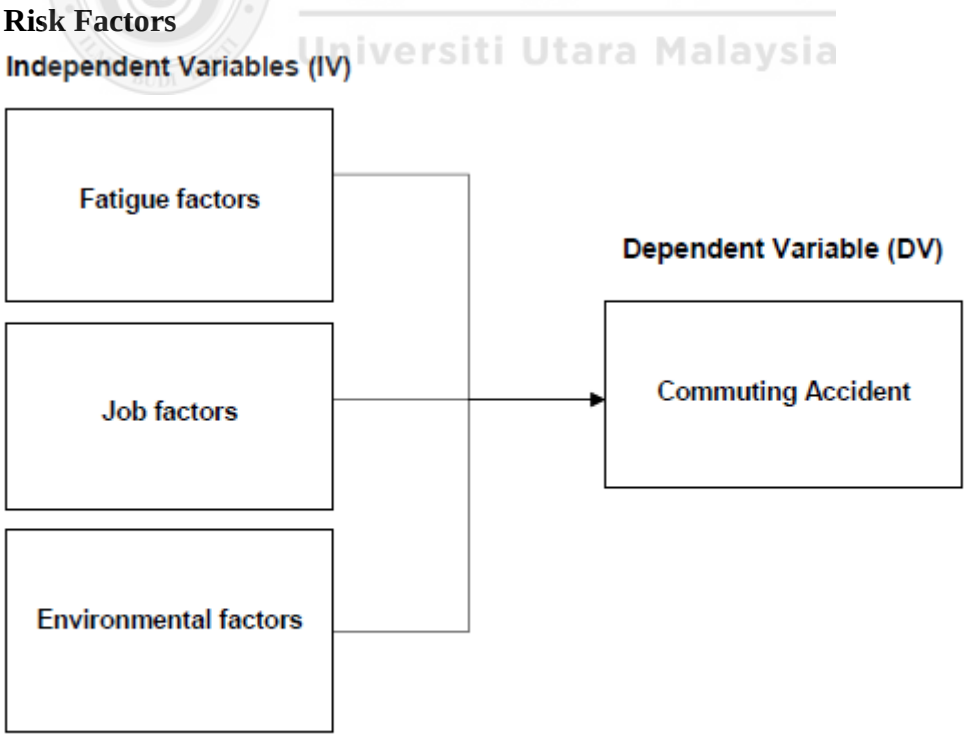

Figure 3.1: Research Framework

3.3 Research Design

The study was conducted at Hospital Banting, Selangor, to investigate the various factors contributing to commuting accidents to and from the workplace among nurses. The participants involved in this study were registered nurses with a valid Annual Practice License (APC) employed in Hospital Banting, Selangor, and had consented to be involved in the study after being given a brief explanation of the purpose and method of the study.

The study was cross-sectional in which all study variables were measured at the same point of time. The type of study is correlational in nature. Suggest you add in additional information why a cross-sectional survey was used and how it fits with what you want to study.

This study began with a preliminary investigation and the results from the pilot study were used for conceptual development and analysis. This helped to further refine the research framework for data evaluation and implementation.

3.4 Population and Sampling

A total of 143 nurses participated in the survey, including 30 nurses who were in the initial pilot survey. From total population size, so 113 taken as sample size (Krejcie & Morgan, 1970).

The participants in this study were all registered nurses with a valid Annual Practice License (APC) in Hospital Banting Selangor. All the participants also had to

fulfil the requirement of commuting to or from the workplace within a minimum radius of 2km by any method of transport. All of them also gave their consent and agreed to be involved in the study after being given a brief explanation of the purpose and method of the study.

The sampling methods used were probability and systematic sampling which were adopted in the process of selecting samples for the target population. The name list of all the nurses in Hospital Banting, Selangor, was obtained. Based on the alphabetically ordered name list, every 3rd name was selected and the rest discarded. The process was repeated until targeted sample size (113 samples) was achieved. Systematic sampling was used because this method is less time-consuming and easier to perform than simple random sampling.

3.5 Data Collection Procedures

Data collection was performed using the survey method. The researcher approached the head nurses in charge of every section for all 113 multi-grade registered nurses working at Hospital Banting, Selangor.

The head nurses from every ward and division were assembled and briefed on the purpose and method of the study. After that, the questionnaires were left with them to be delivered to every nurse in their section which would be collected by the researcher after 14 days. To ensure a better return rate, a reminder was given on every 3 days to the head nurses in charge to monitor the respondents.

A cover letter from University Utara Malaysia (UUM) for Master Project, consent forms and sets of questionnaires were prepared to be distributed among the selected nurses. The questionnaire consisted of relevant questions designed to obtain pertinent feedback from respondents pertaining to the objectives of the study. The participants were given two weeks to complete the survey. For confidentiality purposes, they were not required to identify themselves.

3.6 Research Instrumentation

This study used a questionnaire titled 'Survey on Commuting Accident to and from the Workplace' adapted from an original version of a questionnaire titled 'Survey on Commuting Accident to or Return by Motorcycle' (Ungku Ismith, 2016).

In the questionnaire, participants responded to the items using a 6-point Likert scale ranging from 1 ("Strongly Disagree") to 6 ("Strongly Agree"). The scale is as follows: 1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = slightly agree, 5 = agree and 6 = strongly agree.

The questionnaire adapted from Ungku Ismith (2016) had 5 sections: Section A: Demographic; Section B: Fatigue Factors (10 elements); Section C: Job Factors (10 elements); Section D: Environmental Factors (10 elements); Section E: Commuting accident to or from the workplace (10 elements). The source for each of the sections are shown in Table 3.1:

Table 3.1
Source for every section:

No.	Variable	Operational Definitions	Item	Scale
1	Independent Variable Fatigue Factors	Fatigue factors refers to the issues that arise from excessive working time or poorly designed work rest scheduling. It is generally considered to be a decline in mental and/or physical performance that results from prolonged exertion, sleep loss and/or disruption of the internal clock (Abang et al., 2011).	***Section B*** Question 1–10	Likert Scale: 1(Strongly Disagree) to 6(Strongly Agree)
2	Independent Variable Job Factors	Job factors refers to a paid position of regular employment with specific aspects such as knowledge and skills, mental and physical demands, and working conditions that can be recognized, defined, and assessed (Bronkhorst, 2015).	***Section C*** Question 1–10	Likert Scale: 1(Strongly Disagree) to 6(Strongly Agree)
3	Independent Variable Environmental Factors	Environmental factors refers to the factors that are directly attributable to the environment of the place of accident. Examples of environmental factors in the context of commuting accidents are visibility, weather and traffic flow and time of the accident (Hashim, 2017).	***Section D*** Question 1–10	Likert Scale: 1(Strongly Disagree) to 6(Strongly Agree)
4	Dependent Variable Commuting Accident to or return from Workplace	The amount of travel in which accidents may occur. The higher the frequency of travel, the higher the probability of an accident occurring (Jamaluddin et al., 2015).	***Section E*** Question 1–10	Likert Scale: 1(Strongly Disagree) to 6(Strongly Agree)

Questionnaire adapted from Ungku Ismith (2016**)**

3.7 Data Analysis Techniques

A pilot study was used to determine the reliability of the questionnaire. According to Gardner (2003), a pilot study helps researchers to establish stability and consistency using correlation. For this study, the pilot test involved 30 multi-grade registered clinical nurses at Hospital Banting, Selangor.

The gathered data was analyzed using the SPSS program version 23.0. After coding the data, the frequencies, minimum, and maximum scales of all the items were measured and was then inserted into the SPSS program to determine the respondents' answers. According to Hofmann (2003), descriptive statistics are best employed to describe, organize and summarize the data as it allows for important characteristics of the data to be discussed and inferential statistics represent a particular relationship in the population. Simply put, descriptive statistics help to summarize the sample data and inferential statistics are useful for drawing inferences about the population.

Data screening is used to gather and insert the data into SPSS. It is vital to critically examine the quality of the data collected before moving forward with sophisticated multivariate statistical analysis. With this in mind, Cronbach's alpha, a common measure of internal consistency (or "reliability"), was used in the pilot study to determine the reliability of the questionnaire. The internal consistency Cronbach α needs to be 0.7 or higher for a set to be considered as a scale (Vinodkumar & Bhasi, 2010).

This study deployed three statistical methods to analyze the data. Descriptive statistics was used to describe the basic features, providing a synopsis of the sample and the measures. Mean analysis is one of the descriptive statistical methods used in SPSS version 23.0. This method generates the value of the mean, mod, median, standard deviation, variance, maximum and minimum. Basically, the mean is the average score of distribution. Generally, it is applied in order to indicate the value of scale variables that is been used in a questionnaire to tap the relevant information regarding behavior (Farooqui 2011).

Correlation is a method used to analyze data which measures the linear relationship between two variables by computing a coefficient value. In SPSS version 23.0, the Bivariate Correlations procedure computes Pearson's correlation coefficient, Spearman's rho and Kendall's tau-b with their significance levels. Correlations measure how variables or rank orders are related. Before calculating a correlation coefficient, the data is screened for outliers and evidence of a linear relationship. Pearson's correlation coefficient is a measure of linear association.

A Pearson correlation coefficient is a number that measures the strength and direction of the linear relationship between two variables. The correlation coefficient can range from -1 to +1, with -1 indicating a perfect negative correlation, +1 indicating a perfect positive correlation, and 0 indicating no correlation at all. (A variable correlated with it will always have a correlation coefficient of 1.) The p-value associated with the correlation is known as Sig. (2-tailed). The footnote under the correlation table explains what the single and double asterisks signify.

Before any further interpretation is carried out in the correlation analysis, the Pearson coefficient, also known as the r coefficient value, needs to be calculated first. The r-values indicate the strength of association, while the p-value indicates whether there is a significant correlation between variables or not. According to Cortina (1993), the interpretation of the r-value is as follows: no correlation if the r-value is close to zero; low or weak correlation is if the r-value is lower than 0.5 or less than -0.5; moderate correlation if the r-value is between ±0.5 and ±0.7; and high or strong correlation if the r-value is higher than +0.7 and -0.7.

Regression is calculated by using variance and factorial analyses on the related mean values. Although a one-way analysis of variance is associated with the mean determined by a group of variables, factorial analysis of variance is designed to test the difference between the set of instructions that are grouped by more than one classification variable or factor. As with the one-way analysis of variance, the procedure examines the differences between group mean and the spread of value within groups.

3.8 Summary

The methodology presented in this chapter is intended to provide insight into how the study was conducted in relation to the research objectives outlined in Chapter One. Literature Review (Chapter 2) shows the supporting materials for this paper and the technique of the research can be viewed in Chapter 3. The discussions on the outcome of the study, based on the methodology used, are covered in Chapter Four.

CHAPTER 4

DATA ANALYSIS AND RESULTS

4.1 Introduction

In this chapter, the results of the data analysis are presented. The main data collected via questionnaire survey was coded and analyzed using the Statistical Package for Social Science (SPSS) version 23.0. As outlined in Chapter 3, a few statistical techniques such as reliability analysis, correlation test, and multiple regression test were applied in analyzing the data.

This chapter is divided into several sections and summarizes the results of all the statistical techniques used.

4.2 Overview of Data Collected

4.2.1 Response Rate

One hundred and thirteen (113) surveys were initially sent to Hospital Banting, Selangor, and one hundred and three (103) completed questionnaires were returned. This method abides by the rules for getting the data collection from one hundred fourty-three (143) population size (Krejcie & Morgan, 1970). All surveys were returned and one hundred and three (103) surveys were deemed usable, giving an acceptable response rate of 91.2%.

4.3 Profile of Respondents

Table 4.1

Demographic Profile Respondents

Demographic Factor	Frequency	Percent (%)
GENDER		
Male	3	2.9
Female	100	97.1
MARITAL STATUS		
Single	15	14.6
Married	85	82.5
Divorced	3	2.9
HIGHEST EDUCATION LEVEL		
SPM	7	6.8
STPM/ Diploma	83	80.6
Bachelor Degree	11	10.7
Master Degree	2	1.9
Ph.D. Holder	0	0
RACE		
Malay	91	88.3
Chinese	4	3.9
Indian	6	5.8
Others	2	1.9
AGE		
18–28 years	19	18.4
29–39 years	64	62.1
40–50 years	16	15.5
51–60 years	4	3.9
EXPERIENCE		
Less than 2 years	13	12.6
Between 2 to 5 years	15	14.6
Between 6 to 10 years	35	34.0
More than 10 years	40	38.0
DISTANCE TRAVELLED		
Less than 10KM	54	52.4
Between 10KM to 20KM	31	30.1
Between 20KM to 30KM	13	12.6
More than 30KM	5	4.9

4.4 Goodness of Measures

4.4.1 Reliability Analysis

The following Table 4.2 describes the degree of internal consistency based on the value of Cronbach's alpha. Depending on the internal consistency, different instruments can be utilized (Tavakol & Dennick, 2011).

Table 4.2

Cronbach's alpha value

Cronbach's alpha	Internal Consistency
$\alpha \geq 0.9$	Excellent
$0.8 \leq \alpha \leq 0.9$	Very Good
$0.7 \leq \alpha \leq 0.8$	Good
$0.6 \leq \alpha \leq 0.7$	Moderate
$\alpha < 0.6$	Poor

Table 4.3 shows the reliability analysis results on the variables of the study - fatigue, job, environmental and commuting accident. The responses for the fatigue and job factors were analyzed to be within the internal consistency range for "Good", and environmental factor had the highest value of Cronbach's alpha, falling in the internal consistency range for "Very Good". The variable commuting accident was also in the internal consistency range of "Good". In summary, the internal consistency estimates for the variables in this study, based on Cronbach's alpha, measured in the "Good" range and above, and are thus acceptable.

Table 4.3

Reliability Analysis Result

Variable	Cronbach's Alpha	No. Items
Fatigue	0.751	10
Job	0.724	10
Environmental	0.806	10
Commuting Accident	0.721	10

4.5 Correlations Analysis

In statistics, the correlation coefficient r measures the strength and direction of a linear relationship between two variables. The value of r is always between +1 and -1. To interpret its value, the researcher used Table 4.4, the Rule of Thumb.

Table 4.4

The Rule of Thumb

Size of Correlation	Interpretation
0.90 to 1.00/ -0.90 to -1.00	Very high positive/ negative correlation
0.70 to 0.89/ -0.70 to -0.89	High positive/ negative correlation
0.50 to 0.69/ -0.50 to -0.69	Moderate positive/ negative correlation
0.30 to 0.49/ -0.30 to -0.49	Low positive/ negative correlation
0.01 to 0.29/ 0.01 to -0.29	Little if any correlation
0.00	No significant correlation

Table 4.5

Pearson Correlations for variables

	Fatigue	Job	Environmental	Commuting Accident
Fatigue	1			
Job	0.441**	1		
Environmental	0.382**	0.549**	1	
Commuting Accident	0.445**	0.560**	0.650*	1

** Correlation is significant at the 0.01 level (2–tailed).

Based on Table 4.5, fatigue factor is shown to have less influence on commuting accidents among nurses in Hospital Banting because the relationship has a low positive correlation value. This means that changes in one variable show low correlation with changes in the second variable. In Table 4.5 above, for Fatigue and commuting accident, the Pearson's r is 0.445. This number is less close to 1. Therefore, it can be concluded that there is a low relationship between fatigue and commuting accident variables for nurses from Hospital Banting, Selangor.

Based on Table 4.5, there is a moderate positive relationship between job factor and commuting accident among nurses in Hospital Banting. This means that changes in one variable are moderately correlated with changes in the second variable. These two variables have a Pearson's r of 0.560. This number is moderately close to 1. Therefore, it can be concluded that there is a moderate relationship between job and commuting accident variables for nurses from Hospital Banting, Selangor.

Based on Table 4.5, there is a moderate positive relationship between environmental factor and commuting accident among nurses in Hospital Banting. This means that changes in one variable are moderately correlated with changes in the second variable. The two variables have a Pearson's r value of 0.650. This number is highly moderate as it is closer to 1. Therefore it can be concluded that there is a moderate relationship between fatigue and commuting accident variables for nurses from Hospital Banting, Selangor.

4.6 Multiple Regression Analysis

Multiple regression was used to investigate the relationship between fatigue factors, job factors, environmental factors and commuting accidents among nurses in Hospital Banting.

Table 4.6

Result of Multiple Regressions

Independent Variable	**DEPENDENT VARIABLE : COMMUTING ACCIDENT**				
	Unstandardized Beta	Std. Error	Standard Beta	t-stat	Sig.
Constant	7.821	3.545	-	2.206	0.030
Environmental	0.407	0.077	0.458	5.307	**0.000**
Job	0.244	0.092	0.236	2.658	0.009
Fatigue	0.116	0.056	0.166	2.061	0.042
R^2	0.503				
Adjusted R^2	0.488				
F Value	33.454				
Significant	**0.000**				

From the above output, the commuting accident model of regression equation is depicted as below:

Commuting Accident = 7.821 + 0.407***(Environmental***) + 0.244***(Job***) + 0.116 (***Fatigue***)

Analysis results of multiple regression is used to identify variables to determine the factors that are related and most significant towards commuting accidents, as presented in Table 4.6. The coefficient of multiple determination is 0.503; therefore, about 50.3% of the variation in the commuting accident is explained by fatigue, job and environmental factors for nurses in Hospital Banting

Selangor. The regression equation appears to be very useful for making predictions since the value of R^2 is more than half.

Based on Table 4.6, it can be determined that the environmental factor has the score of 0.407 (*p*–value= 0.000) for commuting accident when both fatigue and job factors are fixed. Moreover, a change in job factor will give an increase of 0.244 (*p*–value= 0.009) in commuting accident with the other factors of fatigue and environmental fixed. However, the fatigue factor only increases the score by 0.116 (*p*–value= 0.042) for commuting accident. Thus, 7.821 is considered constant. As a result of this analysis, the most significant factor is determined to be environmental factor with the highest degree of significance.

Table 4.6 shows that t = 5.307 and *p*-value is equivalent to 0.000 for environmental factor, t = 2.658 and *p*-value is equivalent to 0.009 for job factor, and t = 2.061 and *p*-value is equivalent to 0.042 which means all of them have a *p*-value ≤ 0.05. At the 5% significance level, there exists enough evidence to conclude that the environmental, job and fatigue factors are useful as predictors of commuting accidents for working nurses in Hospital Banting, Selangor.

4.7 Summary

Overall, the data analysis showed that all three independent variables - fatigue factors, job factors and environmental factors - show acceptable internal consistency values and are thus fit. The correlations analysis also show that the three variables are related to the dependent variable, commuting accident, with the most significant being the environmental factor.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 Recapitulation of the study findings

This chapter describes the conclusions reached and the recommendations put forward for future research. It also highlights the significance of the results obtained in the study. The limitations of this study are also specified in order to improve future studies.

Results of the study were organized based on three research questions to achieve the following research objectives of the study: to examine the relationship between fatigue factors and commuting as measured by work–rest scheduling and workload, to study the relationship between job factors as measured by distance traversed and working shift, to observe the relationship between environmental factors as measured by geographical weather and traffic volume and to determine the factors that have the highest degree of correlation with commuting accidents to and from the workplace among nurses.

Summarizing the findings of the study, all independent variables - fatigue factor, job factor and environmental factor - are related to commuting accidents with the most significant being environmental factor.

5.2 Discussion of the research objectives

5.2.1 Discussion of Research Objective 1: To identify the relationship between fatigue factors and commuting accident to or return from the workplace among nurses.

The study found that fatigue factors had a low level of influence towards commuting accidents, as evidenced by the low positive correlation value. Dorrian (2008) found nurses experienced fatigue by feeling sleepiness, tiredness, and other related physical symptoms both at work and during the commute to and from the workplace. Fatigue led to a deterioration of driving performance, manifesting itself in slower reaction time, diminished steering performance, lesser ability to keep a safe distance from the car in front, and increased tendency to mentally withdraw from the driving task (Sando et al., 2010).

Human bodies naturally follow the circadian rhythms of wakefulness and sleepiness, with the desire to sleep strongest between 12 midnight and 6 am in the morning. When sleep or wake patterns are out of synchronization due to work demands, such as prolonged or frequent changing of work schedule, circadian misalignment disturbance of the organization affects human physiology, endocrinology, metabolism, and behaviour (Zhao et al., 2010). Therefore, factors that may contribute to fatigue among nurses such as timetabling constraint and scheduling, the organization being unable to meet the demands of registered clinical nurses needed, lack of quantity of rest and sleep, unexpected attitude of supervisor

and other events, may interfere with nurses' perception and behaviour towards commuting accidents (Batak et al., 2013).

Nurses also reported they suffered from permanent tiredness and limited energy even on their rest days and holidays. This was due to the work-rest scheduling among nurses that kept changing frequently. Hughes (2004) found that workload and frequent work schedule changes disrupted nurses' personal and family life and led to health problems including chronic fatigue, prolonged tiredness, depression and gastrointestinal disorders. The imbalance of work-rest schedules produced a wide range of effects on their physiological systems and nurses needed a minimal of 32 hours of adaptation to fully recover (Moore et al., 2004).

Other studies have shown that the respondent's workload impaired quality of safety because an inadequate number of registered nurses were employed. Adequate staffing is important to sustain the quality of safety (Morlock, 2013). According to the Annual Report of the Ministry of Health (MoH) Malaysia (2011) the number of nurses working in private hospitals was lower than that of nurses working in public hospitals but overall, the total number of nurses was still inadequate (MoH, 2011). Aiken (2012) found that a better working environment in terms of work schedule and workload based on a low patient to nurse ratio improved the quality of safety and perception among nurses. Thus, adequate staffing level was required to improve quality of safety while commuting for nurses (Newhouse et al., 2013).

Based on this study, fatigue is not the main contributing factor towards commuting accident although there is a positive relationship between them. The

findings agree with those of Sando (2010) and Aiken (2013), who both found that commuting accidents occurred due to fatigue factors such as when the driver had insufficient breaks, heavy workload and irregular work schedules.

5.2.2 Discussion of Research Objective 2: To identify the relationship between job factors and commuting accidents to or return from the workplace among nurses.

This study found that job factors among nurses had a greater influence on commuting accidents as it had a moderate positive correlation value. Job factors involved the nature of work, distances travelled to or from the workplace, and shift systems and these were found to contribute to the rising number of commuting accidents among nurses. Gkrizioti et al. (2010) stated that nurses were found to be the profession most prone towards commuting accidents or near misses because of their nature of work that needed them to remain awake and focused on patient care and safety during working hours. Parallel to that, The General Health Director, Datuk Dr. Noor Hisham Abdullah (2015) said there are 295 nurses from 554 total healthcare victims involved in an accident while commuting to or from the workplace following pre-duty or post-duty period.

Distance travelled and route selection while commuting may also affect the likelihood of a commuting accident. Nurses think believe that a short commute of less than 5km to and from the workplace may reduce the incidences of commuting accidents especially if using the same route daily for the journey. According to

Adeoti (2007), nurses who travel a distance of more than 15 kilometres faced a higher possibility of a commuting accident especially during the night shift as they would be tired and sleepy while driving to or from the workplace.

Contrarily, Shafei (2014) found that the commuting accidents mostly occurred between 1 kilometre to 5 kilometres to or from the workplace among delivery service workers in Malaysia. Thus, although it may be a short-distance commute on a frequently-used route, nurses still need to focus and be aware of road safety precautions while commuting to or from the workplace to prevent accidents from occurring.

Nurses' health have also been found to be negatively affected by working shifts especially for those working irregular hours. This can trigger excessive tiredness for nurses as they drive to or from the workplace. Adam at al., (2003) reported that 62 percent of medical workers with irregular schedules had been involved in commuting accidents, compared to only 38 percent of medical workers with regular schedules. Batak et al., (2013) found nurses working shifts often performed poorly with increased risks of errors and accidents. It was also found that nurses on shifts and rotating shifts were more likely to get less sleep and therefore make more mistakes than non-shift nurses. Horne et al. (2009) concluded that shift work is associated with more frequent near misses and accidents.

The findings from this study shows that job factors are not the main contributing factor towards commuting accidents although there is a moderate positive relationship between the two variables. It agrees with previous studies by

Adam et al. (2003), Batak et al. (2013) and Horne et al. (2009) that highlight how commuting accidents can be affected by the nature of work and shift work among nurses. In order to mitigate the adverse influence of such factors, the hospital administrator could adjust the nurses' nature of work and shift schedule by fairly distributing workload in terms of the capability of nurses to perform tasks involving patient care and safety, and not just by only looking at the services needed.

5.2.3 Discussion of Research Objective 3: To identify the relationship between environmental factors and commuting accidents to or return from the workplace among nurses.

The findings from this study showed that environmental factors had an influence towards commuting accidents as the relationship between the two variables had a moderate positive correlation value. The study showed that environmental factors such as road condition, weather condition, and time constraints, contributed to the occurrence of commuting accidents among the nurses in Hospital Banting.

Poor road conditions to and from the workplace could easily cause nurses to be involved in commuting accidents. Even on a slippery road, traffic jam, or in hazardous road conditions, nurses would not have any option but to complete their journey. Thus, the presence of such factors increased the possibility of nurses getting into commuting accidents, especially when coupled with the urgency to complete the journey due to time constraint. Nurses reported feeling pressure to complete journeys where weather conditions were exceptionally difficult because on such occasions,

traffic congestion would be increased. Hennessy & Wiesenthal (1999) stated that an increase in traffic volume leading to traffic congestion can make drivers stressed and indirectly, lead to drivers getting involved in commuting accidents to and from the workplace.

Based on this study's findings, environmental factors highly contribute towards the number of the commuting accident because geographical weather and traffic volume strongly affects the commuting experience for nurses in Hospital Banting, Selangor.

In terms of geographical conditions, nurses will usually have difficulties finding an appropriate location to stop and rest due to tiredness and sleepiness. This is based on the road development structure where there is no highway and no rest and relaxation (R&R) station along the way for nurses who stay in and commute from neighboring areas such as Klang, Shah Alam, Sepang, and Putrajaya. According to Marmor & Nicholas (2006), geographical conditions can cause nurses, especially motorcyclists, to be involved in commuting accidents. Motorcyclists are more vulnerable than drivers of other vehicles as motorcycles only have two tires which are not strong enough to avoid accidents from happening.

Based on data from the study's respondents, commuting accidents are more likely to happen if the driver does not understand the various methods of reducing risks such as taking extra caution while driving in heavy rains or strong winds, especially when the driver is young and has less driving experience.

According to Marmor & Nicholas (2006), young drivers aged 18–28 years old had the highest number of commuting accidents because they still lacked driving experience, and safety behavior awareness, and this led to a slow adaptation in reducing the risk of commuting accidents.

Therefore, this study agrees with the findings of Marmor & Nicholas (2006) that geographical conditions and driver adaptation skill on the environmental factor aspect are the highest contributors towards commuting accidents.

5.3 Limitations of the Study

According to Huberman, Michael, & Miles (2017), the limitations of a study can be defined as those attributes of design or methodology that obstruct or influence the clarification of the findings from the research.

There are two main limitations to this study. Firstly, this study relied on the quantitative methodology of data collection, thus it is restrictive. In addition, the survey method was used for data collection and it is self–reported data. Thus, it could lead to unclear data because certain questions may be interpreted differently by different respondents. Similarly, it could lead to vague results. As the data were self-report, there is the potential that participants were not entirely truthful, thereby impacting the validity of the study.

Next, the respondents were limited to only nurses in Hospital Banting, Selangor, who commute to and from the workplace and could potentially be

involved in commuting accidents. The respondents were mostly female. Gender differences may account for a person's perception and behavior. Thus, it can be concluded that the findings of the study cannot be generalized to Malaysia's working population as a whole.

5.4 Recommendations

Given the limitations of the current study, it is recommended that future research could focus on nurses who have experienced commuting accidents or near misses. The future study should target nurses from different hospitals and multiple states. This would eliminate the effect of perception bias in the results. Studies with a larger sample size would be essential to obtain results which could be representative of nurses in Malaysia. Both of these sampling methods may provide more accurate results applicable to real world settings.

Future research could also include other factors such as examining distracting behaviors that may impact daily commuting safety behaviors, for example, cell phone use while commuting, in addition to weather, traffic conditions and road conditions. It could also include the specific vehicle used for commuting to examine if there were differences in commuting accident rates between those driving a car or riding a motorcycle, for example. This would further refine the research findings on commuting adaptation behavior and experiences.

5.5 Implications

It is important to focus on having better solutions for preventing commuting accidents among nurses before such incidents become a major problem in Malaysia. Oxley et al., (2013) claimed certain betterment measures include enhancing the safety policies of using roads, and making efforts to change road users' negative behaviors through the use of safe driving and riding training. It is essential to reduce the risks of driving behaviors such as speeding, overtaking, turning safely, and keeping an adequate distance between vehicles. Hence, the findings of this study will help to develop more targeted measures to improve cost-effective safety awareness programs for all nurses.

Furthermore, it is the duty of all employers to ensure that their workers are not only safe in their workplace but also while on their journey to and from the workplace. Therefore, it is crucial that for workers to understand occupational risks and dangers. Commuting accidents can be prevented by changes in attitude. Awareness and self-encouragement would be the best action that could be taken by individuals to avoid commuting accidents. The role of the organization's human resource management would be to enforce OSH aspects including safety-driving training and improving safety culture. Safety-driving training, especially in bad weather conditions and poor road conditions, would enable nurses to change their behavior and protect their lives and health.

Hence, a multi-pronged implementation of programs that impart practical knowledge merely than just increasing awareness of Occupational Safety and Health aspects would help reduce and prevent the occurrences of commuting accidents.

5.6 Suggestions for future research

i. Research Methodology

Since this study was restricted to the quantitative methodology used in data collection, it is recommended that further research should be undertaken that adopts both quantitative and qualitative methodology for data collection to provide a wider perspective. It is also advisable to carry out a structured interview to ensure that the survey data is more meaningful, precise and robust.

ii. Geographical Area

This study focused on responses from nurses in Hospital Banting, Selangor. Thus, it is recommended that the scope of the geographical area for future research be widened. Indirectly, this would allow for better result generalization.

iii. Employer's Perspective

This research paper demonstrates the pain and suffering incurred by employees and their employers as a result of commuting accidents to and from the workplace. Employers should understand that an employee and his/her family can be affected by an accident, to a far greater extent than is generally realized. Thus, they

need to have policies in place to fairly delegate tasks and allow their employees to have a balanced workload.

iv. **Education and Society**

The employee and employer must both strive for higher safety awareness, especially when it comes to commuting. The employer should provide training programs on various aspects of road safety not for just nurses, but for all healthcare workers in the organization.

Instead of only educating the employees, indirectly, the employers could also educate the general public to become more aware and abide by the safety rules for commuting to and from the workplace. Employees should be educated on the serious costs and effect commuting accidents can have on them and their families.

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Appendix A

SAMPLE QUESTIONNAIRE

UNIVERSITI UTARA MALAYSIA

Dear Respondents,

I am Master student that has enrolled for this program which is Master in Occupational Safety and Health Management (MOSH) of University Utara Malaysia and conducting a survey among Hospital Banting nurses which specifically within the service sector to fulfill the Master's requirement of the university.

I understand and recognize that your time is valuable and many demands are made upon it by your heavy workload. However, your participation in this survey, which will require only about 10–15 minutes of your time, is vital to the success of this study.

All the information provided in this questionnaire will be confidential for the present study purposes. No information pertaining to individuals will be divulged to any third person or organization. In sum, the information obtained in this study will be used purely for academic purposes only.

Should you have any queries regarding this research please do not hesitate to contact me at **amal.farhana@gmail.com** or call me at **014-2396727**. Thank you very much for your cooperation in responding to the questionnaire. Your participation in this study is greatly appreciated.

Best Regards,

Amal Farhana Binti Adenan
Master in Science of Occupational Safety and Health Management's Candidate

Section A: Demographic Information
Bahagian A: Maklumat Demografik

Please check ( ) in the appropriate box or fill in the blank, where appropriate.
Sila tandakan ( ) dalam kotak yang berkenaan.

1. Gender / *Jantina*:

   ❑ Male / *Lelaki* ❑ Female / *Perempuan*

2. Marital status / *Status Perkahwinan*:

   ❑Single / *Bujang* ❑ Married / *Berkahwin* ❑ Divorced / *Janda atau Duda*

3. Highest educational level/ *Tahap pendidikan*:

   ❑ SPM ❑ STPM / Diploma ❑ Bachelor Degree / *Ijazah Sarjana Muda*
   ❑Master Degree / *Ijazah Sarjana* ❑ PhD Holder / *Doktor Falsafah*
   (Others please specify/ *lain–lain, sila nyatakan*):_____

4. Race / *Bangsa*:

   ❑Malay/ *Melayu* ❑ Chinese/ *Cina* ❑Indian/ *India* (Others, please specify/ *Lain–lain, sila nyatakan*): _____

5. Age / *Umur*:_____years / *tahun*:

   ❑ 18–28 years/*tahun* ❑ 29–39 years/*tahun* ❑ 40–50 years/*tahun* ❑ 51–60years/*tahun*

6. How long have you been working with current company? / *Berapa lamakah anda berkhidmat pada pekerjaan semasa anda?*

   ❑ Less than 2 years / *Kurang daripada 2 tahun.*
   ❑ Between 2 to 5 years / *Antara 2 sehingga 5 tahun.*
   ❑ Between 6 to 10 years / *Antara 6 sehingga 10 tahun.*
   ❑ More than 10 years / *lebih daripada 10 tahun.*

7. How long the distance that you have to travel to or return from workplace?/ *Berapakah jarak antara tempat kerja anda dari / ke rumah anda?*

   ❑ Less than 10KM / *Kurang daripada 10KM.*
   ❑ Between 10KM to 20KM / *Antara 5KM sehingga 20KM.*
   ❑ Between 20KM to 30KM /*Antara 20KM sehingga 30KM.*
   ❑ More than 30KM / *Lebih daripada 30KM.*

SURVEY OF COMMUTING ACCIDENT TO OR RETURN FROM WORKPLACE/ *SOAL SELIDIK BERKENAAN KEMALANGAN PERJALANAN SEMASA PERGI DAN BALIK DARI TEMPAT KERJA*

Strongly Disagree/Sangat Tidak Setuju	Disagree/Tidak Setuju	Slightly Disagree/Sedikit Tidak Setuju	Slightly Agree/ Sedikit Setuju	Agree/Setuju	Strongly Agree/ Sangat Setuju
1	2	3	4	5	6

Instruction: As an employee which frequently to or return from your workplace, you have to think about your fatigue factors, job or work factors and environmental factors which can cause commuting accident to or return from the workplace. To what extent you agree or disagree with whether each statement below based on your potential, situation, or experience? **Circle** your answer using the scale provided.

Arahan: *Sebagai pekerja yang sering berulang ke atau balik dari tempat kerja, anda hendaklah memikirkan faktor keletihan, tugasan dan pekerjaan dan alam sekitar yang menyumbang pada berlakunya kemalangan semasa pergi dan balik dari tempat kerja. Sejauh manakah anda bersetuju atau tidak bersetuju pada kenyataan yang diberikan dalam jadual di bawah mengikut potensi, situasi atau pengalaman anda? Kemudian, bulatkan jawapan yang berkenaan mengikut skala yang yang telah diberikan.*

Section B: Fatigue Factors
Bahagian B: Faktor–Faktor Keletihan

1	I do appear to "suffer" from permanent tiredness, even on rest days and holidays, because I have the limitless energy. *Saya mengalami keletihan yang teruk walaupun semasa cuti rehat atau cuti umum disebabkan kekurangan tenaga.*	1	2	3	4	5	6
2	I have ever felt sleepy while I am driving to or return from the workplace. *Saya akan berasa mengantuk semasa memandu pergi dan balik dari tempat kerja.*	1	2	3	4	5	6
3	I think my pressure at the workplace can cause a commuting accident. *Saya rasa tekanan di tempat kerja akan menyebabkan berlakunya kemalagan perjalanan.*	1	2	3	4	5	6
4	I continued to drive after noticing symptoms of sleepiness. *Saya akan meneruskan perjalanan jika terdapat simptom mengantuk atau kepenatan.*	1	2	3	4	5	6
5	My work-rest scheduling is kept changing frequently which may cause fatigue because I need some time to adapt and adjust my working time. *Jadual rehat saya sentiasa bertukar dari sesama ke semasa yang boleh menyebabkan keletihan kerana saya memerlukan masa untuk menyesuaikan diri dengan perubahan jadual kerja.*	1	2	3	4	5	6

6	My workload prompted me which I can consider as the factors of the commuting accident. *Bebanan tugasan saya di tempat kerja boleh dijadikan sebagai faktor–faktor berlakunya kemalangan perjalanan.*	1	2	3	4	5	6
7	Stress in the workplace can positively influence my focus when I commute to or return from the workplace. *Tekanan di tempat kerja boleh mempengaruhi tumpuan semasa berulang–alik ke tempat kerja.*	1	2	3	4	5	6
8	My perception towards commuting accident can be avoided if my workload will be improved and to be more reasonable. *Persepsi saya terhadap kemalangan perjalanan boleh diatasi jika bebanan tugasan saya dapat dibaiki dan lebih berpatutan.*	1	2	3	4	5	6
9	Work–rest scheduling which designated for me is realistic. *Jadual rehat yang dilakarkan untuk saya adalah realistik.*	1	2	3	4	5	6
10	I do feel my heavy workload can impact the quality of safety when I have to commute to or return from the workplace. *Saya merasakan bebanan tugasan saya boleh memberi kesan terhadap kualiti keselamatan apabila saya berulang–alik dari tempat kerja.*	1	2	3	4	5	6

Section C: Job or Work Factors
Bahagian C: Faktor–Faktor Tugasan dan Pekerjaan

1	I think that short distance for traveling to or return from the workplace can avoid an accident will happen. *Saya rasa jarak yang dekat untuk perjalanan pergi dan balik dari tempat kerja boleh mengelakkan daripada berlakunya kemalangan.*	1	2	3	4	5	6
2	I am the sort of person who feels at my best early in the morning, and who tends to feel tired earlier than most people in the evening. *Saya adalah orang yang suka pada waktu pagi dan akan merasai kepenatan dengan kadar segera pada waktu petang berbanding dengan orang lain.*	1	2	3	4	5	6
3	I do still use the same route thoroughly when I have commuted to or return from workplace even though there are no safety precautions on the road for who is undertaking the journey. *Saya masih menggunakan arah perjalanan yang sama semasa saya pergi dan balik dari tempat kerja, walaupun tanpa mempunyai langkah–langkah keselamatan yang terdapat di atas jalan raya.*	1	2	3	4	5	6

4	My employer considered advising to me that work irregular hours can cause dangers of driving home to or return from the workplace when I have excessively tired. *Apabila saya menghadapi keletihan yang berlebihan, majikan akan memberi nasihat kepada saya bahawa bekerja pada masa yang tidak tetap akan menyebabkan bahaya apabila memandu pulang ke rumah sama ada dari atau ke tempat kerja.*	1	2	3	4	5	6
5	I am the type of person who can get distraction to focus on road safety while I am driving for long distance. *Saya adalah orang yang mudah mendapat gangguan fokus di atas jalan raya apabila saya memandu pada jarak yang jauh.*	1	2	3	4	5	6
6	I do feel that overall the advantages of my shift system outweigh the disadvantages. *Saya merasakan sistem jadual kerja adalah lebih baik daripada keburukan.*	1	2	3	4	5	6
7	To what extent do you agree with the following statements about traveling to work by small vehicle like a motorcycle can be more exposed with the accident on the road compared by using another type of vehicles? *Sejauh manakah anda bersetuju pada kenyataan bahawa* memandu kenderaan kecil seperti *menunggang motosikal ke tempat kerja adalah lebih berisiko untuk terjebak dalam kemalangan jalan raya berbanding dengan menggunakan kenderaan yang lain.*	1	2	3	4	5	6
8	My health has been affected by working shifts which may cause an accident when I have to commute to or return from the workplace. *Kesihatan* saya terjejas dengan bekerja syif yang boleh *menyebabkan kemalangan apabila berulang ke atau dari tempat kerja.*	1	2	3	4	5	6
9	Do you agree that the driver will not be put at risk from commuting accident caused by driving excessive distances without appropriate breaks? *Adakah anda bersetuju bahawa pemandu tidak akan berada dalam keadaan berisiko terhadap kemalangan perjalanan kerana memandu dalam jarak yang jauh tanpa rehat yang betul.*	1	2	3	4	5	6
10	I have been involved in a 'near hit' where I felt that my safety, or the safety of my colleagues or the public especially on the road, was at risk because of some aspect of shift work. *Saya hampr terlibat dengan kemalangan dimana saya merasakan keselamatan diri saya atau keselamatan rakan sekerja saya atau orang awam terutamanya di atas jalan raya adalah berisiko disebabkan oleh sebahagian daripada aspek bekerja syif.*	1	2	3	4	5	6

Section D: Environmental Factors
Bahagian D: Faktor–Faktor Alam Sekitar

1	I will always consider the poor weather conditions, such as heavy rain or foggy, when I am planning the journeys. *Saya sentiasa menitiberatkan aspek cuaca yang teruk dalam merancang perjalanan saya seperti hujan lebat atau kabus.*	1	2	3	4	5	6
2	Are you satisfied that sufficient time is allowed to complete journeys safely? *Adakah anda berpuas hati jika mempunyai masa yang mencukupi untuk perjalanan yang lengkap dan selamat?*	1	2	3	4	5	6
3	I have checked my vehicle frequently in terms of properly equipped to operate in poor weather conditions, for example, my tires are fitted on the slippery road. *Saya kerap memeriksa kenderaan saya untuk memastikan berada dalam keadaan beroperasi yang baik dalam cuaca yang buruk contohnya tayar yang selamat ketika berada di atas jalan raya yang licin.*	1	2	3	4	5	6
4	I try to avoid periods of peak traffic flow. *Saya cuba untuk mengelakkan kesesakkan lalu lintas semasa tempoh yang sibuk.*	1	2	3	4	5	6
5	Do you agree if your journey times and routes can be adjusted to take account of poor weather conditions to avoid from accident occurred? *Adakah anda bersetuju jika perjalanan dan masa anda boleh di ubah apabila berlakunya cuaca yang buruk untuk mengelakkan daripada berlakunya kemalangan?*	1	2	3	4	5	6
6	Do you feel pressured to complete journeys where weather conditions are exceptionally difficult because the number of traffic congested is kept increasing at a certain period of time? *Adakah anda mengalami tekanan bagi menlengkapi perjalanan semasa cuaca buruk yang tidak dapat dielakkan kerana kesesakkan trafik yang semakin meningkat dari semasa ke semasa?*	1	2	3	4	5	6
7	Commuting accident can be caused by bad weather if the driver does not understand, how to reduce risks such as should take extra care if driving in strong winds or heavy rains. *Kemalangan perjalanan boleh disebabkan oleh cuaca yang buruk jika pemandu tidak memahami untuk mengurangkan risiko seperti mengambil perhatian yang lebih jika memandu dalam keadaan angin kencang atau hujan lebat.*	1	2	3	4	5	6

8	Do you agree, when traffic is congested between your resident to or return from your workplace can cause you to have an accident while commuting? *Adakah anda bersetuju, jika kesesakkan trafik antara tempat tinggal anda ke atau dari tempat kerja boleh menyebabkan kemalangan?*	1	2	3	4	5	6
9	I know who to contact if I have to cancel a journey to or return from the workplace because of poor weather conditions. *Saya tahu untuk menghubungi pihak yang berkenaan jika saya ingin membatalkan perjalanan pergi atau balik dari tempat kerja semasa cuaca yang buruk.*	1	2	3	4	5	6
10	During traffic congested, I will always take into account on safety consideration for my journeys such as speed limit, road conditions and safety place to stop during a n emergency also other safety aspects on the road. *Semasa kesesakkan trafik, saya akan memastikan langkah–langkah keselamatan dalam perjalanan diambil kira seperti kelajuan had laju,* keadaan *jalan, tempat selamat yang boleh berhenti semasa keadaan kecemasan serta lain–lain aspek keselamatan di atas jalan raya.*	1	2	3	4	5	6

Section E: Commuting Accident To or Return from Workplace
Bahagian E: Kemalangan Perjalanan Pergi dan Balik dari Tempat Kerja

1	Navigating should travel in which of the following positions within a lane? *Pemandu seharusnya memandu mengikut posisi dalam garis lurus yang betul.*	1	2	3	4	5	6
2	A smaller vehicle like motorcycles and bicycles are easy to spot, even against a cluttered background. *Kenderaan kecil seperti penunggang motorsikal dan basikal adalah senang untuk dilihat walaupun berlatarbelakang yang serabut atau tidak tersusun di atas jalan raya.*	1	2	3	4	5	6
3	The motorcycle test is easier than the driving test. *Ujian memandu motorsikal adalah lebih senang berbanding ujian memandu kereta.*	1	2	3	4	5	6
4	When driving in interweaving traffic, I am aware that motorcycles, bicycles, and pedestrian are harder to spot. *Apabila memandu dalam keadaan trafik yang yang berhubung seperti kesesakkan trafik, keadaan laluan motorsikal, laluan basikal dan pejalan kaki adalah sukar bagi saya untuk melihat.*	1	2	3	4	5	6

5	In average smaller vehicle driver like a motorcycle should take greater precautions than the bigger vehicle driver in wet weather condition. *Secara purata, pemandu kenderaan kapasiti kecil seperti motorsikal adalah perlu untuk mengambil lebih terhadap langkah keselamatan berbanding bagi pemandu kenderaan kapasiti besar yang lain semasa berada dalam keadaan cuaca yang buruk.*	1	2	3	4	5	6
6	It is easier for small vehicle size like motorcyclists to make sudden swerves to avoid an accident than car drivers. *Pemandu kenderaan bersaiz kecil seperti penunggang motorsikal adalah lebih mudah untuk membuat lencongan atau penukaran arah secara mendadak bagi mengelakkan kemalangan berbanding dengan pemandu kereta.*	1	2	3	4	5	6
7	Driving at night is easy as daytime. *Memandu di waktu malam hari adalah sama sahaja seperti memandu di waktu siang hari.*	1	2	3	4	5	6
8	You can suddenly be surprised by the appearance of other vehicle coming from behind. *Kehadiran kenderaan lain dari arah belakang boleh menyebabkan anda terkejut secara tiba–tiba.*	1	2	3	4	5	6
9	I perform all appropriate visual checks on my vehicle prior moving. *Saya memeriksa semua hal yang berkaitan dengan alat penglihatan pada kenderaan sebelum memulakan perjalanan.*	1	2	3	4	5	6
10	The driver should take more care to look out for others road user. *Pemandu seharusnya perlu memberikan lebih perhatian terhadap laluan atau pergerakkan pengguna jalanraya yang lain.*	1	2	3	4	5	6

END OF QUESTIONNAIRE/ TAMAT SOAL SELIDIK
THANK YOU/ TERIMA KASIH